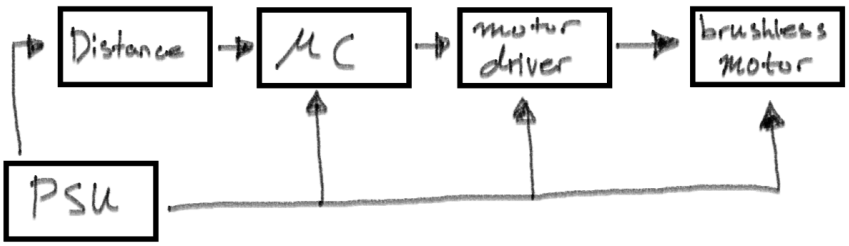
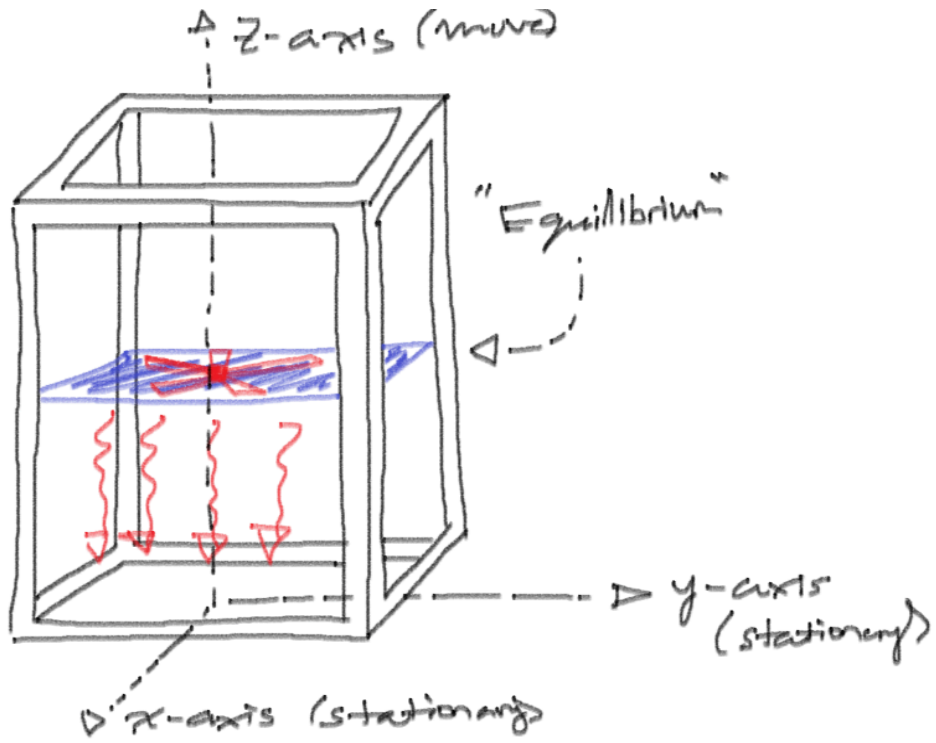
Logbook

09/09/2025

- The original idea was to make a drone, but it is way too complicated for one semester.
- Our project can be described as a dumbwaiter that uses a propeller instead of mechanical parts.
- We are using a single motor to power a propeller that goes up to a point considered "equilibrium". Weight, push, or pull forces can be done on the propeller. That would lead to the propeller increasing or decreasing speed to get back to the "equilibrium" point.
- The electronics we so far need are as follows: switches (x2), psu (x1), distance sensor (x1), brushless DC motor (x1), motor driver (x1), and microcontroller (x1).
    - Distance sensor we might use
    - Have to talk about it but might add a display
- A frame of sorts is going to be needed to keep the propeller stationary in the x and y direction, only moving in the z direction.
- Current block diagram:



- Possible design:



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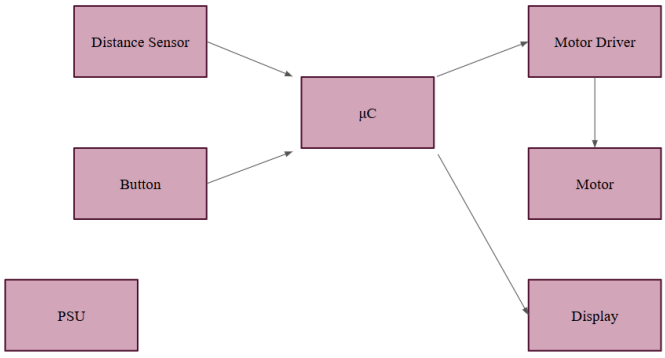
- There is another possible design for the frame that uses like 3 to 4 poles and that is what keeps the drone travelling only on the z-axis.
- We have decided that the drone will have all of its electrical components in one place which means the frame is just a structure to hold it in place.
- The button to turn the drone on and off will be on one side which keeps us away from using wires to connect all the electronics together.
- The electronics will probably mostly be placed in the center or in a way that the weight is evenly distributed.
- The motor and propeller we use will have to create enough downward force to move the drone up and down.
- The electronics we so far need are as follows: switches (x1), psu (x1), distance sensor (x1), brushless DC motor (x1), motor driver (x1), and microcontroller (x1). We also have to look into a voltage regulator since the drone would be running on a battery for power.
- Updated block diagram from last time:



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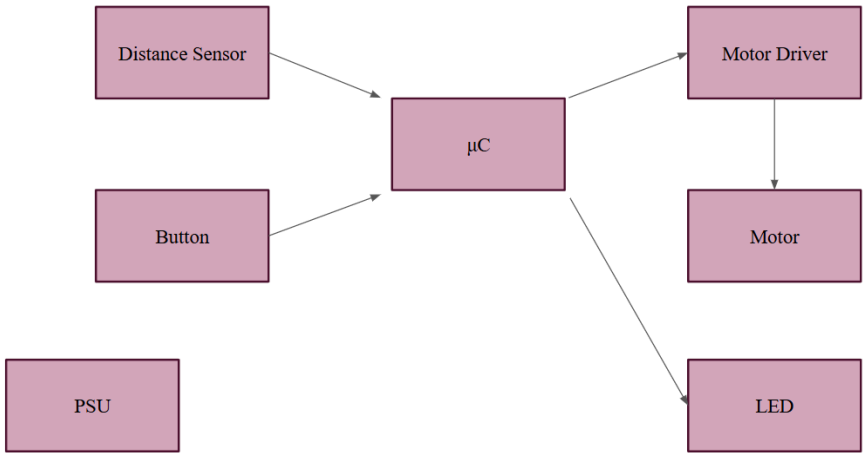
- New block diagram:



- Originally, we were thinking of using a display for giving user feedback about the drone but an LED was decided to be easier for this current prototype.
- The electronics we so far need are as follows: switches (x1), psu (x1), distance sensor (x1), brushless DC motor (x1), motor driver (x1), LED (x1), and microcontroller (x1). We also have to look into a voltage regulator since the drone would be running on a battery for power.
- Links to some electronics:
    - Microcontroller - Multiple ones we can choose from
    - Distance Sensor - The one professor talked about
    - LED - Any RGB LED will do, just have it there for reference
    - Button - Just have this button for reference, what ever is best
- Looking into motors, specifically for drones, there are some things to be aware of. Most specify the number of cells the LiPo battery has using “xS”. So 4S is 4 cells in series. To find the thrust they can produce, we can just look at the manufacturer’s info.
    - Possible motor with ESC - So the number of cells needed would be 4S and can max thrust 1024 g. From reading online, a good thrust-to-weight ratio is 2:1 for the basic movements of a drone which should be more than enough for us. The motor and ESC need like 4s which is almost 15 volts.
- A single LiPo cell is around 3.7 volts.
    - Possible battery
- Need a buck converter. If not, the battery will kill the ESP32.
- Possible names: AirLift or HMS (Height Maintenance System).

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- Other possible design: